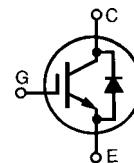


HiPerFAST™ IGBT

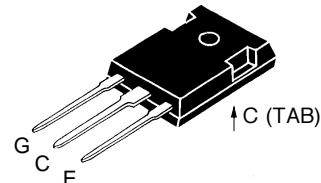
Lightspeed™ Series

IXGH 12N60CD1

 $V_{CES} = 600$ V $I_{C25} = 24$ A $V_{CE(sat)} = 2.7$ V $t_{fi(typ)} = 55$ ns

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	600	V
V_{GCR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1\text{ M}\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	24	A
I_{C90}	$T_C = 90^\circ\text{C}$	12	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1 ms	48	A
SSOA (RBSOA)	$V_{GE} = 15\text{ V}$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 33\text{ }\Omega$ Clamped inductive load, $L = 300\text{ }\mu\text{H}$	$I_{CM} = 24$ @ $0.8\text{ }V_{CES}$	A
P_c	$T_C = 25^\circ\text{C}$	100	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
M_d	Mounting torque with screw M3 Mounting torque with screw M3.5	0.45/4 Nm/lb.in. 0.55/5 Nm/lb.in.	
Weight		6	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$

TO-247 AD



G = Gate, C = Collector,
E = Emitter, TAB = Collector

Features

- Very high frequency IGBT
- New generation HDMOS™ process
- International standard package JEDEC TO-247AD
- High peak current handling capability

Symbol	Test Conditions	Characteristic Values		
		($T_J = 25^\circ\text{C}$, unless otherwise specified)	min.	typ.
BV_{CES}	$I_C = 250\text{ }\mu\text{A}$, $V_{GE} = 0\text{ V}$	600		V
$V_{GE(th)}$	$I_C = 250\text{ }\mu\text{A}$, $V_{GE} = V_{GE}$	2.5		5.0 V
I_{CES}	$V_{CE} = 0.8\text{ }V_{CES}$ $V_{GE} = 0\text{ V}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		200 μA 1.5 mA
I_{GES}	$V_{CE} = 0\text{ V}$, $V_{GE} = \pm 20\text{ V}$			$\pm 100\text{ nA}$
$V_{CE(sat)}$	$I_C = I_{CE90}$, $V_{GE} = 15\text{ V}$	2.1	2.7	V

Applications

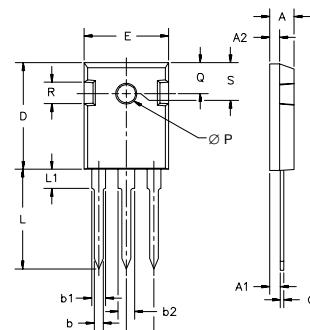
- PFC circuit
- AC motor speed control
- DC servo and robot drives
- Switch-mode and resonant-mode power supplies
- High power audio amplifiers

Advantages

- Fast switching speed
- High power density

Symbol	Test Conditions	Characteristic Values		
		min.	typ.	max.
g_{fs}	$I_C = I_{C90}$; $V_{CE} = 10$ V, Pulse test, $t \leq 300$ μ s, duty cycle ≤ 2 %	5	11	S
C_{ies} C_{oes} C_{res}	$V_{CE} = 25$ V, $V_{GE} = 0$ V, $f = 1$ MHz	860	pF	
		100	pF	
		15	pF	
Q_g Q_{ge} Q_{gc}	$I_C = I_{C90}$, $V_{GE} = 15$ V, $V_{CE} = 0.5 V_{CES}$	32	nC	
		10	nC	
		10	nC	
$t_{d(on)}$ t_{ri} $t_{d(off)}$ t_{fi} E_{off}	Inductive load, $T_J = 25^\circ C$ $I_C = I_{C90}$, $V_{GE} = 15$ V, $L = 300$ μ H $V_{CE} = 0.8 V_{CES}$, $R_G = R_{off} = 18 \Omega$ Remarks: Switching times may increase for V_{CE} (Clamp) $> 0.8 V_{CES}$, higher T_J or increased R_G	20	ns	
		20	ns	
		60	ns	
		55	ns	
		0.09	mJ	
$t_{d(on)}$ t_{ri} E_{on} $t_{d(off)}$ t_{fi} E_{off}	Inductive load, $T_J = 125^\circ C$ $I_C = I_{C90}$, $V_{GE} = 15$ V, $L = 300$ μ H $V_{CE} = 0.8 V_{CES}$, $R_G = R_{off} = 18 \Omega$ Remarks: Switching times may increase for V_{CE} (Clamp) $> 0.8 V_{CES}$, higher T_J or increased R_G	20	ns	
		20	ns	
		0.5	mJ	
		85	180	ns
		85	180	ns
		0.27	0.60	mJ
R_{thJC}	IGBT		1.25	K/W
R_{thCK}		0.25		K/W

TO-247 AD Outline



Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.7	5.3	.185	.209
A ₁	2.2	2.54	.087	.102
A ₂	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b ₁	1.65	2.13	.065	.084
b ₂	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	.205	.225
L	19.81	20.32	.780	.800
L ₁		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	.232	.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC

Reverse Diode (FRED)

(T_J = 25°C, unless otherwise specified)

Symbol	Test Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 15$ A; $T_{VJ} = 150^\circ C$ $T_{VJ} = 25^\circ C$	1.7		V
I_{RM}	$V_R = 100$ V; $I_F = 25$ A; $-di_F/dt = 100$ A/ μ s $L < 0.05$ μ H; $T_{VJ} = 100^\circ C$	2	2.5	A
t_{rr}	$I_F = 1$ A; $-di/dt = 50$ A/ μ s; $V_R = 30$ V $T_J = 25^\circ C$	35		ns
R_{thJC}	Diode		1.6	K/W

IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715 6,306,728B1
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025